GROUP THEORY.

7. Proposed by M. E. GRABER, A. M., Heidelberg University, Tiffin, Ohio.

Which linear substitution will transform $x_1x_2+x_3x_4+x_5x_6=0$ into $y_1^2+y_2^2+y_3^2-y_4^2-y_5y_6=0$?

Remark by the PROPOSER.

One substitution having the desired property is

$$\left\{\begin{matrix} x_1, & x_2, & x_3, & x_4, & x_5, & x_6, \\ y_1+iy_2, & y_1-iy_2, & y_3+y_4, & y_3-y_4, & -y_5, & y_6, \end{matrix}\right\}^*$$

where $i=\sqrt{-1}$.

PROBLEMS FOR SOLUTION.

ALGEBRA.

237. Proposed by F. P. MATZ, Sc. D., Ph. D., Reading, Pa.

Solve $x^2+y+z=12$.....(1); $x+y^2+z=8$.....(2); $x+y+z^2=6$.....(3).

238. Proposed by S. A. COREY, Hiteman, Iowa.

Prove that $\frac{1}{1+n}+\frac{1}{3(n+3)}+\frac{1}{5(n+5)}+\text{.....}=\frac{1}{2}\left[\frac{1}{(n-1)}+\frac{1}{3(n-3)}+\frac{1}{5(n-5)}+\text{.....}+\frac{1}{l(n-l)}\right]$, n being an even positive integer and $l=n-1$.

239. Proposed by J. J. KEYES, Fogg High School, Nashville, Tenn.

Solve $\sqrt[4]{(41+x)}+\sqrt[4]{(41-x)}=4$.

GEOMETRY.

260. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Perpendiculars to the radius vector are drawn through points on $r=a+b\cos n\theta$. Find the radius of curvature of their envelope at a point at a given distance from the origin.

261. Proposed by R. D. CARMICHAEL, Hartselle, Alabama.

Given three non-intersecting circles; to draw eight tangent circles, each tangent to all three of the given circles.

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*More generally, one set of substitutions fulfilling the required conditions, is

$$\left\{\begin{matrix} x_1, & x_2, & x_3, & x_4, & x_5, & x_6, \\ ay_1\pm aiy_2, & ay_1\mp aiy_2, & ay_3\pm ay_4, & ay_3\pm ay_4, & \pm ay_5, & \mp ay_6, \end{matrix}\right\}$$

where a is not equal 0. ED. E.